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EXAMINER	
LE, VU	

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2613	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/694,712	LIPTON, ALAN J.
	Examiner	Art Unit
	Vu Le	2613

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 February 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-58* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-58* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in-
(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent; or
(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, *except* that an international application filed under the treaty defined in section 351(a) shall have the effects for the purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English.

2. Claims 1-5, 16-20, 29-42, 51-58 are rejected under 35 U.S.C. 102(e) as being anticipated by Bulman et al, US Publication 2003/0051255.

Re claim 1, Bulman et al discloses a method (figs. 3, 19) comprising the steps of: extracting an object of interest from a video stream (211-212, para. 0265-0266); analyzing said object from said video stream to obtain an analyzed object (213, para. 0267); manipulating said analyzed object to obtain a synthetic character (215-216, para. 0569-0270); and assembling a virtual video using said synthetic character (217, para. 0271, also para. 0167-0168).

Re claim 2, the method of claim 1, wherein said step of extracting comprises the step of employing a stochastic background modeling technique to detect said object in said video stream. (See para. 0266).

Re claim 3, the method of claim 1, wherein said step of extracting comprises the step of employing a motion detection technique to detect said object in said video stream. (See para. 0266).

Re claim 4, the method of claim 1, wherein said step of extracting comprises the step of employing a segmentation technique to detect said object in said video stream. (See para. 0266, also para. 0036).

Re claim 5, the method of claim 1, wherein said step of extracting comprises the step of extracting background components from said video stream. (See para. 0266).

Re claim 16, the method of claim 1, wherein said step of manipulating is directed by a user. (See para. 0165, 0167).

Re claim 17, the method of claim 1, wherein said step of manipulating is directed by a computation engine. (See para. 0206-0208).

Re claim 18, the method of claim 1, wherein said synthetic character is a hybrid based on said object of interest and computer-generated imagery. (See figs. 12A-12E, para. 0233).

Re claim 19, the method of claim 1, further comprising the step of providing a second synthetic character generated by a computer graphics engine, and wherein said step of assembling comprises the step of assembling said virtual video using said synthetic character and said second synthetic character. (See para. 0245-0247, in these segments, a library of synthetic images is provided to produce a virtual video).

Re claim 20, the method of claim 1, wherein said step of assembling comprises the step of inserting said synthetic character into said video stream. (See para. 0244-0247).

Re claim 29, the method of claim 1, wherein said step of assembling comprises the step of removing said synthetic character from said video stream. (See para. 0082, this segment discusses the ability to customize synthesized content so that arbitrary substitutions, additions and alterations may applied).

Re claim 30, the method of claim 29, wherein said step of removing comprises the step of filling in pixels in frames of said video stream with pixels from a background model for said synthetic character removed from said video stream. (See para. 0207-0209).

Re claim 31, the method of claim 29, wherein said step of removing comprises the step of repairing at least one of an uncovered background, a foreground object, and another synthetic character. (See para. 0082, this segment discusses the ability to customize synthesized content so that arbitrary substitutions, additions and alterations may applied. In this context, the capability of repairing at least one of an uncovered background, a foreground object, and another synthetic character would have been inherent through the process of customization).

Re claim 32, the method of claim 1, further comprising the step of determining functional areas within said video stream. (See fig. 19: 212, para. 0265-0269, in this segment, the step of extracting object(s) from a video stream would have inherently include the step of determining functional areas within said video stream).

Re claim 33, the method of claim 1, further comprising performing the method of claim 1 for a plurality of objects of interest in said video stream. (The limitations have been analyzed and rejected w/r to claim 32. In this segment, multiple objects are considered).

Re claim 34, the method of claim 1, wherein said steps of extracting, analyzing, manipulating, and assembling are performed in real time. (See para. 0270, see also para. 0049).

Re claim 35, the method of claim 1, wherein at least one of said steps of extracting, analyzing, manipulating, and assembling is performed in non-real time. (The limitations have been analyzed and rejected w/r to claim 1, also see para. 0030, 0049, 0100, in this segment, Bulman et al discloses the intent of real-time or near real-time processing, however, the process has the inherent capability to perform in non real-time as claimed).

Re claim 36, the method of claim 1, wherein said video stream comprises a background for a game. (See para. 0054, 0080).

Re claim 37, the method of claim 1, wherein said video stream comprises a simulation. (See para. 0082).

Re claim 38, the method of claim 1, wherein said video stream comprises a teleconference. (See para. 0078).

Re claim 39, the method of claim 1, wherein said video stream comprises a distance education presentation. (See para. 0078, this segment discusses on-line

multimedia presentation, which inherently is capable of distance education presentation).

Re claim 40, a computer system to perform the method of claim 1. (See fig. 3).

Re claim 41, a system comprising means for processing to perform the method of claim 1. (See fig. 3).

Re claim 42, a computer-readable medium comprising software to perform the method of claim 1. (See fig. 3, also para. 0161-0163).

Claim 51 recites "[A]" method comprising the steps of: extracting in real time a background model from a video stream; generating in real time a synthetic character; and assembling in real time a virtual video based on said background model and said synthetic character[.]" (The limitations have been analyzed and rejected w/r to claims 1-2).

Re claim 52, a method as in claim 51, wherein said step of generating comprises generating said synthetic character using a computer graphics engine. (The limitations have been analyzed and rejected w/r to claims 1-2, 18-19).

Re claim 53, a method as in claim 51, further comprising the step of extracting in real time an object of interest from said video stream, and wherein said step of generating comprises generating said synthetic character using said object. (The limitations have been analyzed and rejected w/r to claims 1-2, 34).

Re claim 54, a method as in claim 51, further comprising the step of extracting in real time an object of interest from said video stream, and wherein said step of generating comprises generating said synthetic character using said object and a

computer graphics engine. (The limitations have been analyzed and rejected w/r to claims 1-2, 18-19, 34).

Re claim 55, a method as in claim 51, further comprising the step of identifying a functional area in said video stream, and wherein said step of assembling comprises assembling said virtual video based on said background model, said synthetic character, and said functional area. (The limitations have been analyzed and rejected w/r to claims 1-2, 32).

Re claim 56, a computer system to perform the method of claim 51. (The limitations have been analyzed and rejected w/r to claims 1-2, 40).

Re claim 57, a system comprising means for processing to perform the method of claim 51. (The limitations have been analyzed and rejected w/r to claims 1-2, 41).

Re claim 58, a computer-readable medium comprising software to perform the method of claim 51. (The limitations have been analyzed and rejected w/r to claims 1-2, 42).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bulman et al as applied to claim 1 above and further in view of Lipton et al, "Moving Target Classification and Tracking from Real-time Video".

Re claim 6, Bulman et al discloses the method of claim 1, wherein said step of extracting comprises the steps of: determining if a pixel in a frame of said video stream represents an object that is moving based on a stochastic model of a background scene in said frame (see analysis/rejection w/r to claim 2), but fails to disclose "clustering pixels in said frame that represent said object that is moving" as claimed.

Lipton et al makes it well known and obvious extracting an object comprising the steps of: determining if a pixel in a frame of said video stream represents an object that is moving based on a stochastic model of a background scene in said frame; and clustering pixels in said frame that represent said object that is moving (para. 3: "Target Classification", in this segment, clustering is used to identify and classify moving object(s) from background clutter for target tracking application).

Therefore, taking the combined teaching of Bulman et al and Lipton et al as a whole, it would have been obvious to augment the object extraction algorithm in Bulman et al to include clustering to identify and classify moving object(s) from background clutter as suggested in Lipton et al for the benefit of robust identification of objects of interest, rejection of background clutter, and continuous tracking of objects over a period of time despite occlusions, appearance changes and cessation of object motion (Abstract).

Re claim 7, Bulman et al discloses object extraction (see analysis/rejection w/r to claim 1), but fails to disclose comprising the step of tracking said object. Lipton et al makes it well known and obvious extracting an object comprising the step of tracking

said object (para. 3: "Target Classification", in this segment, clustering is used to identify and classify moving object(s) from background clutter for target tracking application).

Therefore, taking the combined teaching of Bulman et al and Lipton et al as a whole, it would have been obvious to modify Bulman et al to include object tracking as suggested by Lipton et al for the benefit of surveillance application when such application is desirable.

Re claim 8, the method of claim 7, wherein said step of tracking comprises the steps of: identifying a position of said object in a frame of said video stream; identifying candidate objects in a next frame of said video stream; and comparing said object in said frame with candidate objects in said next frame to determine a next position of said object in said next frame. (See Lipton et al, fig. 7, para. 4: "Tracking", Motivation to combine has been established in claim 7).

5. Claim 9-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bulman et al as applied to claim 1 above and further in view of Lipton, "Virtual Postman – Real-Time, Interactive Virtual Video".

Re claim 9, Bulman et al discloses analyzing said object after extraction (see analysis/rejection w/r to claim 1), but fails to disclose the step of analyzing comprises the step of determining a rigidity of said object. Lipton makes it well known and obvious the step of analyzing an extracted object to determine its rigidity (para. 5: "Character Rigidity", also fig. 4).

Therefore, taking the combined teaching of Bulman et al and Lipton as a whole, it would have been obvious to modify Bulman et al in which object analysis includes rigidity determination as taught by Lipton for the benefit of synthesizing characters to appear realistic so as to replace live characters in a real-time video stream. Also, this capability is beneficial for applications such as computer vision, image analysis, virtual video, and augmented reality (Lipton: Abstract).

Re claim 10, the method of claim 9, wherein said step of determining said rigidity comprises the step of determining a residual flow for said object. (See Lipton, para. 5: "Character Rigidity").

Re claim 11, Bulman et al discloses analyzing said object after extraction (see analysis/rejection w/r to claim 1), but fails to disclose the step of analyzing comprises the step of determining a periodic sequence corresponding to said object. Lipton makes it well known and obvious the step of analyzing comprises the step of determining a periodic sequence corresponding to said object (para. 6: "Determining a Periodic Sequence", also fig. 5).

Therefore, taking the combined teaching of Bulman et al and Lipton as a whole, it would have been obvious to modify Bulman et al in which object analysis includes determining a periodic sequence corresponding to said object as taught by Lipton for the benefit of generating synthetic characters based on video imagery. In other words, to make the synthetic characters appear realistic (Lipton: para. 6: "Determining a Periodic Sequence", also fig. 5).

Re claim 12, the method of claim 11, wherein said periodic sequence represents one cycle of motion of said object over a series of frames, and wherein said periodic sequence comprises, for each frame of said set of frames, a visual appearance of said object and a frame-to-frame displacement of said object. (Lipton: para. 6: "Determining a Periodic Sequence", also fig. 5).

Re claim 13, the method of claim 11, wherein said step of determining said periodic sequence comprises the steps of: collecting a set of visual templates of said object from a series of games of said video stream, said set of visual templates comprising at least one complete period of motion of said object; and matching a present visual template of said object with each visual template of said set of visual templates to determine a starting point of said period of motion of said object. (Lipton: para. 6: "Determining a Periodic Sequence", also fig. 5).

Re claim 14, the method of claim 13, wherein said step of matching comprises the steps of: determining a convolution of said present visual template with each visual template of said set of visual templates; and selecting said starting point of said period of motion based on a minimum of said convolution. (Lipton: para. 6: "Determining a Periodic Sequence", also fig. 5).

Re claim 15, the method of claim 1, wherein said step of analyzing comprises the step of determining a periodic sequence corresponding to said object and at least one parameter describing an appearance of said object, and the method further comprising the step of transmitting or storing said periodic sequence and said at least one parameter. (Lipton: para. 7, 7.1 and 8, in these segments, discussion of using periodic

sequences of templates and velocities i.e. parameter to be captured and then replayed synthetically in arbitrary places and at arbitrary times from virtual video stream is indicative of the inherent need to store and transmit during real-time application).

6. **Claims 21-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bulman et al as applied to claims 1, 20 above and further in view of Lipton, "Virtual Postman – Real-Time, Interactive Virtual Video".**

Re claim 21, Bulman et al discloses inserting synthetic character into the video data stream (see analysis/rejection w/r to claim 20), but fails to disclose that the synthetic character is inserted based on rigidity and periodicity of said synthetic character. Lipton makes it well known and obvious synthetic character is inserted based on rigidity and periodicity of said synthetic character (para. 2: "A Virtual Video Architecture", this segment discusses several situations when it is necessary to insert synthetic characters into the virtual video stream in which rigidity and periodicity of a character are taken into account).

Therefore, taking the combined teaching of Bulman et al and Lipton as a whole, it would have been obvious to modify Bulman et al so that the step of inserting synthetic character into a video stream is based on rigidity and periodicity of said synthetic character. The advantage of this modification would be the ability to identify and categorize different object motion, for example, human or animal motion as opposed to motion of vehicle in a video scene.

Re claim 22, the method of claim 20, wherein said step of inserting comprises the steps of selecting a starting frame in said video stream and a position within said starting frame for inserting said synthetic character; and inserting a periodic sequence corresponding to said synthetic character beginning in said starting frame and at said position. (Lipton: para. 6: "Determining a Periodic Sequence", also fig. 5).

Re claim 23, the method of claim 22, wherein said periodic sequence represents one cycle of motion of said synthetic character, and wherein said periodic sequence comprises, for each frame of said set of frames, a visual template of said synthetic character and a frame-to-frame displacement of said synthetic character. (Lipton: para. 6: "Determining a Periodic Sequence", also fig. 5).

Re claim 24, the method of claim 23, wherein said step of inserting further comprises the step of multiplying each visual template by a scale factor to adjust a size of said synthetic character. (Lipton: para. 6: "Determining a Periodic Sequence", also fig. 5, also para 7: "Synthesizing Characters").

Re claim 25, the method of claim 23, wherein said step of inserting further comprises the step of multiplying each frame-to-frame displacement by a time factor to adjust a speed of motion of said synthetic character. (Lipton: para. 6: "Determining a Periodic Sequence", also fig. 5, also para 7: "Synthesizing Characters").

Re claim 26, the method of claim 23, wherein said step of inserting further comprises the step of applying a flip operator to each visual template to reverse a direction of motion of said

synthetic character in said periodic sequence. (Lipton: para. 6: "Determining a Periodic Sequence", also fig. 5, also para 7: "Synthesizing Characters").

Re claim 27, the method of claim 20, wherein said synthetic character is occluded in said video stream. (Lipton: para. 7.1: "Synthesising Occluded Characters").

Re claim 28, the method of claim 20, wherein said step of inserting comprises the step of modifying at least one of appearance, scale, position, speed, direction of motion, and timing, prior to insertion of said synthetic character into said video stream. (Lipton: para. 6: "Determining a Periodic Sequence", also fig. 5, also para 7: "Synthesizing Characters").

7. Claim 43, 45-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bulman et al in view of Lipton et al, "Moving Target Classification and Tracking from Real-time Video".

Claim 43 recites "[A] method comprising the steps of: obtaining a video stream as a setting for one of a video game, a simulation, a teleconference, and a distance education presentation; tracking a moving object in said video stream; analyzing said moving object to obtain an analyzed moving object; generating a synthetic character based on said analyzed moving object; and assembling a visual video based on said synthetic character and said video stream[.]". (The limitations have been analyzed and rejected w/r to claims 1, 7, 37-39).

Re claim 45, the method of claim 43, wherein said step of generating is in response to a user of one of said video game, said simulation, said teleconference, and

said distance education presentation. (The limitations have been analyzed and rejected w/r to claims 1, 7, 16, 37-39).

Re claim 46, the method of claim 43, wherein said step of assembling comprises the step of inserting said moving object into said virtual video based on said synthetic character. (The limitations have been analyzed and rejected w/r to claims 1, 7, 20, 37-39).

Re claim 47, the method of claim 43, wherein said step of assembling comprises the step of removing said moving object from said virtual video based on said synthetic character. (The limitations have been analyzed and rejected w/r to claims 1, 7, 29, 37-39).

Re claim 48, a computer system to perform the method of claim 43. (The limitations have been analyzed and rejected w/r to claims 1, 7, 37-39, 40).

Re claim 49, a system comprising means for processing to perform the method of claim 43. (The limitations have been analyzed and rejected w/r to claims 1, 7, 37-39, 41).

Re claim 50, a computer-readable medium comprising software to perform the method of claim 43. (The limitations have been analyzed and rejected w/r to claims 1, 7, 37-39, 42).

8. Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bulman et al in view of Lipton et al, "Moving Target Classification and Tracking

from Real-time Video" as applied to claim 43 above and further in view of Lipton, "Virtual Postman – Real-Time, Interactive Virtual Video".

Re claim 44, the method of claim 43, wherein said step of analyzing comprises the step of representing said moving object by a periodic sequence. (The limitations have been analyzed and rejected w/r to claims 1, 7 and 11).

9. Claims 1-58 are rejected under 35 U.S.C. 102(a) as being anticipated by Lipton, "Virtual Postman – Real-Time, Interactive Virtual Video".

Re claim 1, Lipton discloses a method (fig. 1) comprising the steps of: extracting an object of interest from a video stream (fig. 1, para. 2: A Virtual Video Architecture); analyzing said object from said video stream to obtain an analyzed object (fig.1, para. 2: A Virtual Video Architecture); manipulating said analyzed object to obtain a synthetic character (fig. 1, para. 2: A Virtual Video Architecture); and assembling a virtual video using said synthetic character (fig. 1, para. 2: A Virtual Video Architecture).

Re claim 2, the method of claim 1, wherein said step of extracting comprises the step of employing a stochastic background modeling technique to detect said object in said video stream. (See fig. 1, para. 2: A Virtual Video Architecture).

Re claim 3, the method of claim 1, wherein said step of extracting comprises the step of employing a motion detection technique to detect said object in said video stream. (See fig. 1, para. 2: A Virtual Video Architecture, also para 3: Detection of Moving Objects).

Re claim 4, the method of claim 1, wherein said step of extracting comprises the step of employing a segmentation technique to detect said object in said video stream.

(See fig. 1, para. 2: A Virtual Video Architecture, also para 3: Detection of Moving Objects).

Re claim 5, the method of claim 1, wherein said step of extracting comprises the step of extracting background components from said video stream. (See fig. 1, para. 2: A Virtual Video Architecture).

Re claim 6, the method of claim 1, wherein said step of extracting comprises the steps of: determining if a pixel in a frame of said video stream represents an object that is moving based on a stochastic model of a background scene in said frame; and clustering pixels in said frame that represent said object that is moving. (See fig. 1, para. 2-5, in these segment, stochastic model of a background scene is discussed as well as clustering pixels).

Re claim 7, the method of claim 1, further comprising the step of tracking said object. (See para. 4: Tracking Targets).

Re claim 8, the method of claim 7, wherein said step of tracking comprises the steps of: identifying a position of said object in a frame of said video stream; identifying candidate objects in a next frame of said video stream; and comparing said object in said frame with candidate objects in said next frame to determine a next position of said object in said next frame. (See para. 4-6).

Re claim 9, the method of claim 1, wherein said step of analyzing comprises the step of determining a rigidity of said object. (See para. 5: "Character Rigidity", also fig. 4).

Re claim 10, the method of claim 9, wherein said step of determining said rigidity comprises the step of determining a residual flow for said object. (See Lipton, para. 5: "Character Rigidity").

Re claim 11, the method of claim 1, wherein said step of analyzing comprises the step of determining a periodic sequence corresponding to said object. (See para. 6: "Determining a Periodic Sequence", also fig. 5).

Re claim 12, the method of claim 11, wherein said periodic sequence represents one cycle of motion of said object over a series of frames, and wherein said periodic sequence comprises, for each frame of said set of frames, a visual appearance of said object and a frame-to-frame displacement of said object. (Lipton: para. 6: "Determining a Periodic Sequence", also fig. 5).

Re claim 13, the method of claim 11, wherein said step of determining said periodic sequence comprises the steps of: collecting a set of visual templates of said object from a series of games of said video stream, said set of visual templates comprising at least one complete period of motion of said object; and matching a present visual template of said object with each visual template of said set of visual templates to determine a starting point of said period of motion of said object. (Lipton: para. 6: "Determining a Periodic Sequence", also fig. 5).

Re claim 14, the method of claim 13, wherein said step of matching comprises the steps of: determining a convolution of said present visual template with each visual template of said set of visual templates; and selecting said starting point of said period

of motion based on a minimum of said convolution. (Lipton: para. 6: "Determining a Periodic Sequence", also fig. 5).

Re claim 15, the method of claim 1, wherein said step of analyzing comprises the step of determining a periodic sequence corresponding to said object and at least one parameter describing an appearance of said object, and the method further comprising the step of transmitting or storing said periodic sequence and said at least one parameter. (See Lipton: para. 7, 7.1 and 8, in these segments, discussion of using periodic sequences of templates and velocities i.e. parameter to be captured and then replayed synthetically in arbitrary places and at arbitrary times from virtual video stream is indicative of the inherent need to store and transmit during real-time application).

Re claim 16, the method of claim 1, wherein said step of manipulating is directed by a user. (See para. 1, 8, these segments discuss a player interacts with a video game to manipulate analyzed object to obtain synthetic character).

Re claim 17, the method of claim 1, wherein said step of manipulating is directed by a computation engine. (See para. 1: Introduction, in this segment, object analysis and synthetic character manipulation are computer controlled).

Re claim 18, the method of claim 1, wherein said synthetic character is a hybrid based on said object of interest and computer-generated imagery. (See fig. 1, para. 1-2).

Re claim 19, the method of claim 1, further comprising the step of providing a second synthetic character generated by a computer graphics engine, and wherein said step of assembling comprises the step of assembling said virtual video using said

synthetic character and said second synthetic character. (See figs. 1, 5, para. 1-2, in fig. 5 for example, a template of multiple synthetic characters are available for selection).

Re claim 20, the method of claim 1, wherein said step of assembling comprises the step of inserting said synthetic character into said video stream. (See fig.1, para.1-2).

Re claim 21, the method of claim 20, wherein said synthetic character is inserted based on rigidity and periodicity of said synthetic character. (See para. 2: "A Virtual Video Architecture", this segment discusses several situations when it is necessary to insert synthetic characters into the virtual video stream in which rigidity and periodicity of a character are taken into account).

Re claim 22, the method of claim 20, wherein said step of inserting comprises the steps of selecting a starting frame in said video stream and a position within said starting frame for inserting said synthetic character; and inserting a periodic sequence corresponding to said synthetic character beginning in said starting frame and at said position. (Lipton: para. 6: "Determining a Periodic Sequence", also fig. 5).

Re claim 23, the method of claim 22, wherein said periodic sequence represents one cycle of motion of said synthetic character, and wherein said periodic sequence comprises, for each frame of said set of frames, a visual template of said synthetic character and a frame-to-frame displacement of said synthetic character. (Lipton: para. 6: "Determining a Periodic Sequence", also fig. 5).

Re claim 24, the method of claim 23, wherein said step of inserting further comprises the step of multiplying each visual template by a scale factor to adjust a size of said synthetic character. (Lipton: para. 6: "Determining a Periodic Sequence", also fig. 5, also para 7: "Synthesizing Characters").

Re claim 25, the method of claim 23, wherein said step of inserting further comprises the step of multiplying each frame-to-frame displacement by a time factor to adjust a speed of motion of said synthetic character. (Lipton: para. 6: "Determining a Periodic Sequence", also fig. 5, also para 7: "Synthesizing Characters").

Re claim 26, the method of claim 23, wherein said step of inserting further comprises the step of applying a flip operator to each visual template to reverse a direction of motion of said synthetic character relative to a direction of motion of said synthetic character in said periodic sequence. (Lipton: para. 6: "Determining a Periodic Sequence", also fig. 5, also para 7: "Synthesizing Characters").

Re claim 27, the method of claim 20, wherein said synthetic character is occluded in said video stream. (Lipton: para. 7.1: "Synthesising Occluded Characters").

Re claim 28, the method of claim 20, wherein said step of inserting comprises the step of modifying at least one of appearance, scale, position, speed, direction of motion, and timing, prior to insertion of said synthetic character into said video stream. (Lipton: para. 6: "Determining a Periodic Sequence", also fig. 5, also para 7: "Synthesizing Characters").

Re claim 29, the method of claim 1, wherein said step of assembling comprises the step of removing said synthetic character from said video stream. (See para. 1, 8, these segments discuss the ability to remove synthetic character from a video stream).

Re claim 30, the method of claim 29, wherein said step of removing comprises the step of filling in pixels in frames of said video stream with pixels from a background model for said synthetic character removed from said video stream. (See para. 1-2, 8, these segments discuss the above limitations).

Re claim 31, the method of claim 29, wherein said step of removing comprises the step of repairing at least one of an uncovered background, a foreground object, and another synthetic character. (See para. 1-2, 8, these segments discuss the above limitations).

Re claim 32, the method of claim 1, further comprising the step of determining functional areas within said video stream. (See figs. 1, 4-5, para. 2-6, these segments discuss the above limitations).

Re claim 33, the method of claim 1, further comprising performing the method of claim 1 for a plurality of objects of interest in said video stream. (The limitations have been analyzed and rejected w/r to claim 32. In this segment, multiple objects are considered).

Re claim 34, the method of claim 1, wherein said steps of extracting, analyzing, manipulating, and assembling are performed in real time. (See Abstract).

Re claim 35, the method of claim 1, wherein at least one of said steps of extracting, analyzing, manipulating, and assembling is performed in non-real time.

(Lipton discusses real-time application, however, capability to perform in non real-time is inherent).

Re claim 36, the method of claim 1, wherein said video stream comprises a background for a game. (See fig. 1, para. 1-2).

Re claim 37, the method of claim 1, wherein said video stream comprises a simulation. (See Abstract, para. 1-2).

Re claim 38, the method of claim 1, wherein said video stream comprises a teleconference. (See para. 1).

Re claim 39, the method of claim 1, wherein said video stream comprises a distance education presentation. (See para. 1, this segment discusses video-teleconferencing, which inherently has the capability of distance education presentation).

Re claim 40, a computer system to perform the method of claim 1. (See para. 1-2).

Re claim 41, a system comprising means for processing to perform the method of claim 1. (See para. 1-2).

Re claim 42, a computer-readable medium comprising software to perform the method of claim 1. (See para. 1-2).

Claims 43-58 have been analyzed and rejected w/r to claims 1-42 above.

Claim Objections

10. Claims 45, 54 are objected to because of the following informalities: The identified claims have punctuation problems. They do not end with a period. Appropriate correction is required.

Contact

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vu Le whose telephone number is 703-308-6613. The examiner can normally be reached on M-F 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chris Kelley can be reached on 703-305-4856. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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